

Date: Tuesday, 01/05/2007 2:24:01 PM
 User: Linda Lacelle

Process Sheet

Split 20705-16

Customer : CU-DAR001 Dart Helicopters Services
 Job Number : 31870-1
 Estimate Number : 12709
 P.O. Number : N/A
 This Issue : 01/05/2007 S.O. No. : *plk*
 Prsht Rev. : NC
 First Issue : *N/A* Type : LARGE FAB ASSY
 Previous Run : 31870
 Written By : _____
 Checked & Approved By : _____
 Comment : Est Rev:A New Issue 07-02-07 JLM
 est rev B revB dwg EC

Drawing Name : GUIDE ASSEMBLY
 Part Number : D3572041
 Drawing Number : D3572 REV.B
 Project Number : N/A
 Drawing Revision : B
 Material : *N/A*
 Due Date : 13/05/2007

Qty: 60 Um: Each

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 D35723 GUIDE



Comment: Qty.: 4.0000 Each(s)/Unit Total : 240.0000 Each(s)
 GUIDE
 Batch: *B31912*

PD 07-05-15 (14)

2.0 D35727 CAP



Comment: Qty.: 2.0000 Each(s)/Unit Total : 120.0000 Each(s)
 CAP
 Batch: *B31914*

PD 07-05-15 (14)

3.0 D35725 BRACKET



Comment: Qty.: 1.0000 Each(s)/Unit Total : 60.0000 Each(s)
 BRACKET
 Batch: *B31913*

PD 07-05-15 (14)

4.0 M6061T6T1000W188 6061T6 TUBE 1.00 X .188W



Comment: Qty.: 2.3405 f(s)/Unit Total : 140.4270 f(s)
 6061-T6 Round Tube 1.00"x 0.188 wall
 Batch: *M18101 07.02*

M18147

30.426

SUBSTITUTE 1" OD 6061-T6

LE 07.05.14

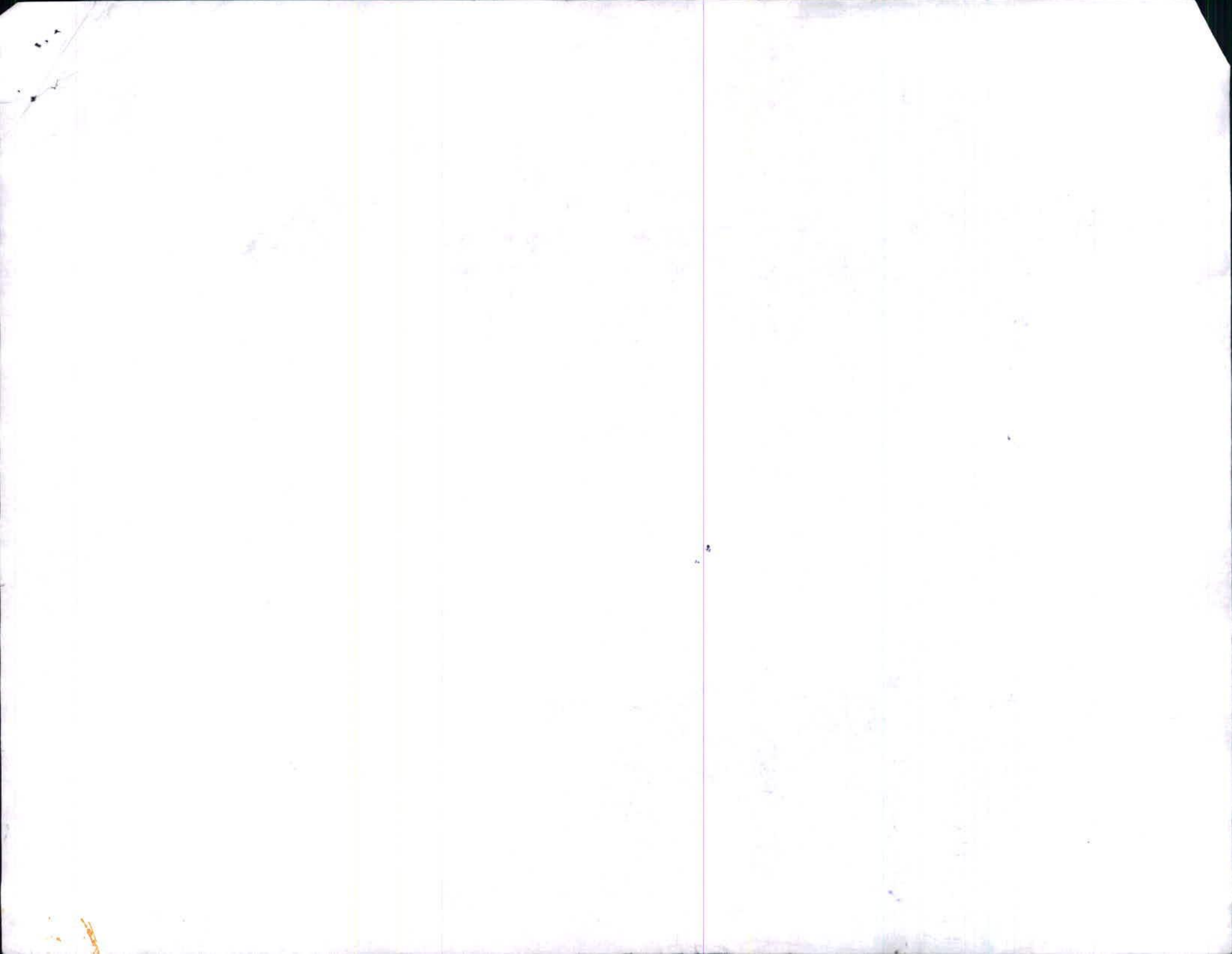
28 07/05/11

5.0 LARGE FAB 1 LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1
 1-Cut Tube D3572-1 as per Dwg D3572

28 07/05/11 (16)



Date: Tuesday, 01/05/2007 2:24:01 PM
User: Linda Lacelle

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: GUIDE ASSEMBLY

Job Number: 31870

Part Number: D3572041

Job Number:



Seq. #:

Machine Or Operation:

Description :

2-Weld D3572-3 guides ,D3572-7 caps and D3572-5 bracket as per Dwg D3572

A/R AL ROD

Batch: M102756

3-Grind welds for end caps.

07-05-13 (14) →

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

07-05-15 (14)

7.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

07/05/15 (14)

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

07/05/15 (14)

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat Grey Sandtex (Ref: 4.3.5.6) as per QSI 005 4.3

07/05/15 (14x)

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

07/05/16 (8) SQ (8)

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

07/05/16 (8) SQ (8)

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

07/05/16 (8)

Job Completion



07/05/16

Date: Tuesday, 4/17/2007 11:13:58 AM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : GUIDE ASSEMBLY
Job Number : 31870	
Estimate Number : 12709	
P.O. Number :	Part Number : D3572041
This Issue : 4/17/2007 S.O. No. :	Drawing Number : D3572 UNDER REVIEW
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : LARGE FAB ASSY	Drawing Revision : U/R
Previous Run : 31462	Material :
Written By :	Due Date : 5/12/2007 Qty: 60 Um: Each
Checked & Approved By :	
Comment : Est Rev: A New Issue 07-02-07 JLM	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

1.0	D35723	GUIDE
-----	--------	-------



Comment: Qty.: 2.0000 Each(s)/Unit Total : 120.0000 Each(s)
 GUIDE
 Batch: _____

2.0	D35727	CAP
-----	--------	-----



Comment: Qty.: 2.0000 Each(s)/Unit Total : 120.0000 Each(s)
 CAP
 Batch: _____

3.0	D35725	BRACKET
-----	--------	---------



Comment: Qty.: 1.0000 Each(s)/Unit Total : 60.0000 Each(s)
 BRACKET
 Batch: _____

4.0	M6061T6TS0750W062	6061-T6 SQ Tube.75x.062W
-----	-------------------	--------------------------



Comment: Qty.: 2.3405 f(s)/Unit Total : 140.4270 f(s)
 6061-T6 SQ Tube.75x.062W
 Batch: _____

5.0	LARGE FAB 1	LARGE FABRICATION RESOURCE 1
-----	-------------	------------------------------



Comment: LARGE FABRICATION RESOURCE 1
 1-Cut Tube to 26.75" as per Dwg D3572

 2-drill & mill per dwg D3572

 2-Weld as per Dwg D3572

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
07-05-16	10.0	W/O was split for a Qty of 8 on this w/o. 5 re- maining on B31870-2 w/o.	2	07-05-16	8	2 07-05-16	2 07-05-16	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07-05-15	5.0	The distance between the D3572-3 Guides varies from 0.140" → 0.160.	LE 07.05.16 SEE ATTACHED EMAIL FOR DS	ACCEPTABLE	LE 07-05-16 SEE ATTACHED EMAIL FROM DS.		LE 07-05-16	
07-05-15	5.0	1 X D3572-1 tube material was missing. No more left in stock		Replace/substitute using, 1" OD 6061-T6 Solid Rod. → REQUIRED EXTRA HEATING AND WELD MATERIAL				
07-05-15	5.0	1 part took. Used for testing, with solid bar.	2 07-05-15	test & scrap, no replace.	LE 07-05-15	2 07-05-15	2 07-05-15	2 07-05-15

NOTE: Date & initial all entries

Date: Tuesday, 4/17/2007 11:13:59 AM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: GUIDE ASSEMBLY

Job Number: 31870

Part Number: D3572041

Job Number:



Seq. #:

Machine Or Operation:

Description :

A/R AL ROD

Batch: _____

3-Grind welds for end caps.

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

7.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat Grey Sandtex (Ref: 4.3.5.6) as per QSI 005 4.3

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



u JACOBY

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

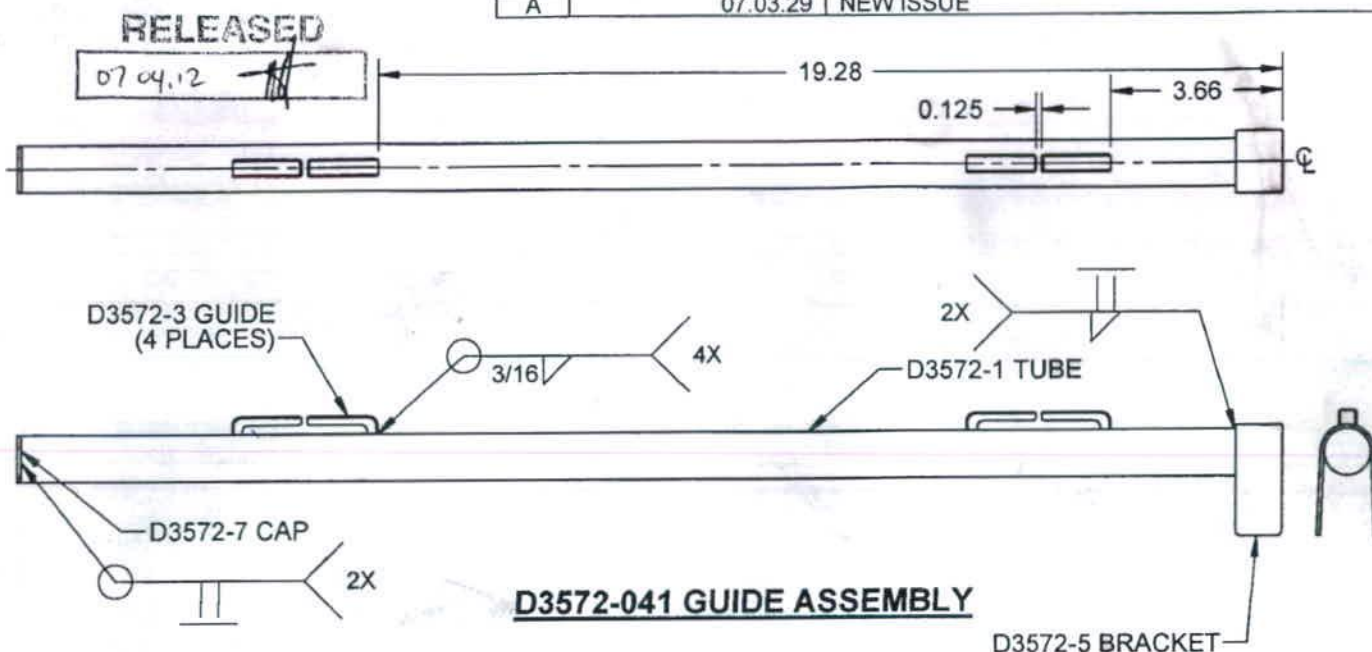
QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

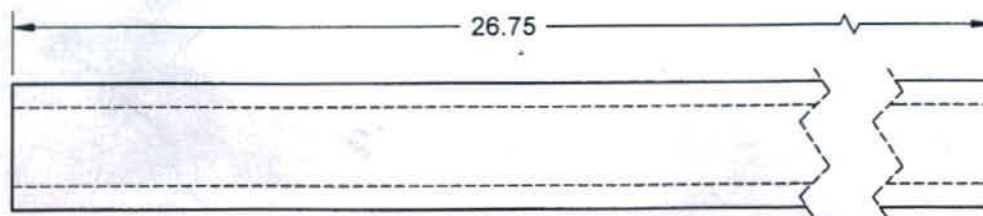
NOTE: Date & initial all entries

DART

DESIGN <i>LE</i>	DRAWN BY <i>LE</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>#</i>	APPROVED <i>#</i>	DRAWING NO. D3572	REV. A SHEET 1 OF 2
DATE 07.03.29		TITLE GUIDE ASSEMBLY	SCALE 1:4
REV A	DATE 07.03.29	DESCRIPTION NEW ISSUE	

**D3572-041 NOTES:**

- 1) PART IS SYMMETRIC ABOUT CENTERLINE
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
POWDER COAT GREY SANDTEX (4.3.5.6) PER DART QSI 005 4.3
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) IDENTIFY WITH DART P/N "D3572-041" USING FINE POINT PERMANENT INK MARKER
- 5) ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
- 6) WELD PER DART QSI 004

**D3572-1 TUBE**0.188 (REF) ϕ 1.000 (REF)**D3572-1 NOTES:**

- 1) MATERIAL: 6061-T6 (OR T62) ALUMINUM TUBE 1.00 OD X 0.188 WALL
PER WW-T-700/6 OR AMS 4080 OR AMS 4082 OR QQ-A-200/8 OR QQ-A-225/8
(REF DART SPEC M6061T6T1.000W.188)
- 2) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 3) ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
- 4) BREAK ALL SHARP EDGES 0.005 TO 0.010 MAX

COPYRIGHT © 2007 BY DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

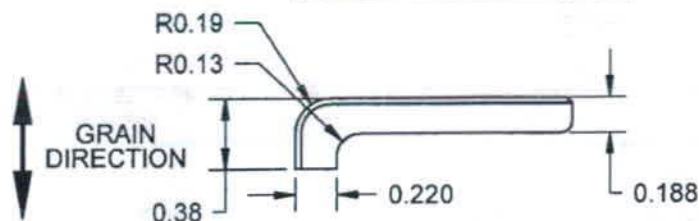
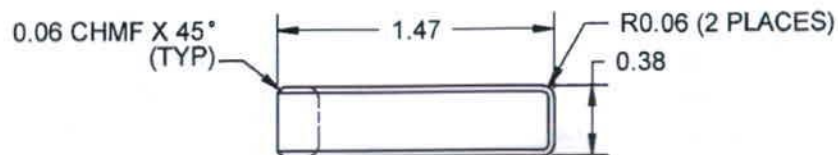
SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 318701000
330
620

12.000

MEMBERS



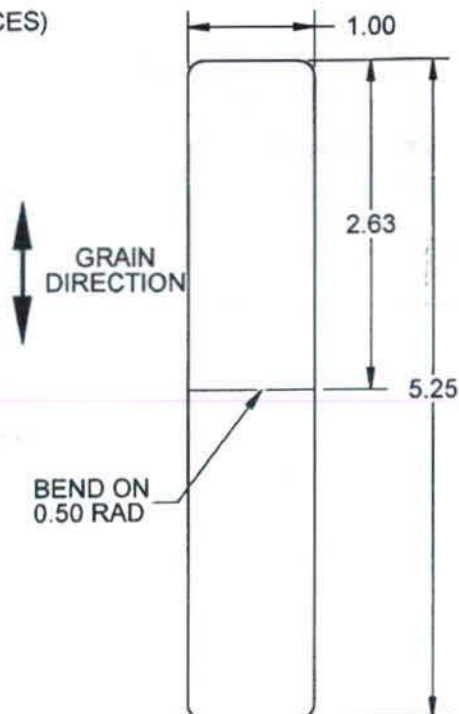
DESIGN <i>LE</i>	DRAWN BY <i>LE</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D3572	REV. A SHEET 2 OF 2
DATE 07.03.29		TITLE GUIDE ASSEMBLY	SCALE 2:3



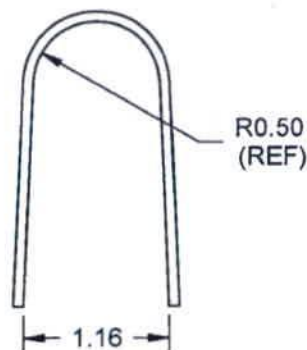
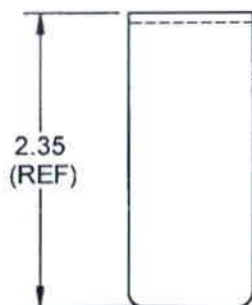
1 **D3572-3 GUIDE**

RELEASED

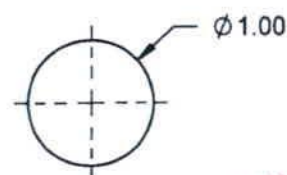
07.04.12 *[Signature]*



2 **D3572-5F FLAT PATTERN**



D3572-5 BRACKET
(MAKE FROM D3572-5F)



2 **D3572-7 CAP**

D3572-3/-5/-7 NOTES:

- 1) D3572-3 MATERIAL: 6061-T6 (OR T651/T6510/T651/T62) ALUMINUM BAR PER QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR QQ-A-200/8 (OR AMS 4160) (REF DART SPEC M6061T6B)
- 2) D3572-5/-7 MATERIAL: 6061-T6 (OR T62) ALUMINUM SHEET 0.080 THICK PER QQ-A-250/11 OR AMS 4025 OR 4027 (REF DART SPEC M6061T6S.080)
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
- 5) BREAK ALL SHARP EDGES 0.005 TO 0.010 MAX

COPYRIGHT © 2007 BY DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

SHOP COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
31870

Leanne Elsliger**From:** Leanne Elsliger [lelsiger@dartaero.com]**Sent:** May 15, 2007 1:16 PM**To:** 'David Shepherd'**Subject:** D3572-041**Attachments:** D3572-041 weld pics 004.jpg; D3572-041 weld pics 001.jpg; D3572-041 weld pics 007.jpg

David – attached are weld pics of D3572-041 (pics 001 and 004). The part at the top of the picture is the part we tested at our official structural test.

Pic 007 is the part we pulled today (guide welded on solid rod). It shows the deflection after 300 lbs weight was applied for about 5 seconds.

Here is a list of the load applied and the measured deflection of that guide:

80 lbs – 0.03 deflection

100 lbs – 0.05 deflection

110 lbs – 0.07 deflection

125 lbs – 0.08 deflection

140 lbs – 0.09 deflection (part examined for cracks on outside – none found)

200 lbs – 0.18 deflection

250 lbs – 0.22 deflection

300 lbs – 0.24 deflection (part removed from test jig – small crack found where weld meets guide on inside)

The ultimate load for upward load is 135.6 per occupant.

Leanne

Leanne Elsliger, P.Eng

Design Engineer

Dart Aerospace Ltd.

1270 Aberdeen St.

Hawkesbury, ON, K6A 1K7

T: (613) 632-5200

F: (613) 632-9311

ADDITIONAL TESTING PERFORMED ON SECOND SAMPLE:

- APPLIED UP TO 350 lbs ON ONE GUIDE (IE 2x D3572-3) WITH NO FAILURE

↳ SOME DEFLECTION OBSERVED, WHICH IS ACCEPTABLE BECAUSE PART WAS SUBSTANTIATED TO ULTIMATE LOADS,

LE 07.05.16.

Leanne Elsliger

From: David Shepherd [dshepherd@dartaero.com]
Sent: May 15, 2007 2:20 PM
To: 'Leanne Elsliger'
Cc: 'Bill Beckett'; 'Peggy McDonald'; 'Linda Lacelle'; 'Jason Murdoch'
Subject: Shoulder Harness Kits

Leanne,

I have looked at the pictures you have sent me regarding the D3572-041 guide assemblies and believe that the parts made with the solid bar (substitute material) are NOT of the same quality as the parts made with the tubing (proper material) for the following reasons:

- a) size of the weld
- b) straightness of the guides
- c) reduced space for the shoulder strap to slide through the guide causing premature belt wear
- d) kit is marginally heavier than we intended

I have talked to Peggy to find out how much of a panic the customers are in for these kits. She has talked to her customers discretely and found that 3 of the 5 kits are an absolute panic. Linda says we will have the proper tubing material on Friday.

Based on the structural testing that you have performed, I do not believe there is a structural issue here.

Therefore, my recommendation is that YOU PERSONALLY select the 6 BEST out of the 14 bars that we have made this morning based on a), b), and c) above and that we complete and ship the kits to the 3 panic customers (2 x Helicopter Express and 1 x Rogers Helicopters) and that we SCRAP the other 8 bars. The remaining kits should be shipped next week with the proper material.

Thanks for bringing this to my attention.

David

No virus found in this outgoing message.

Checked by AVG Free Edition.

Version: 7.5.467 / Virus Database: 269.7.1/805 - Release Date: 5/15/2007 10:47 AM

16/05/2007

